



Microsoft®

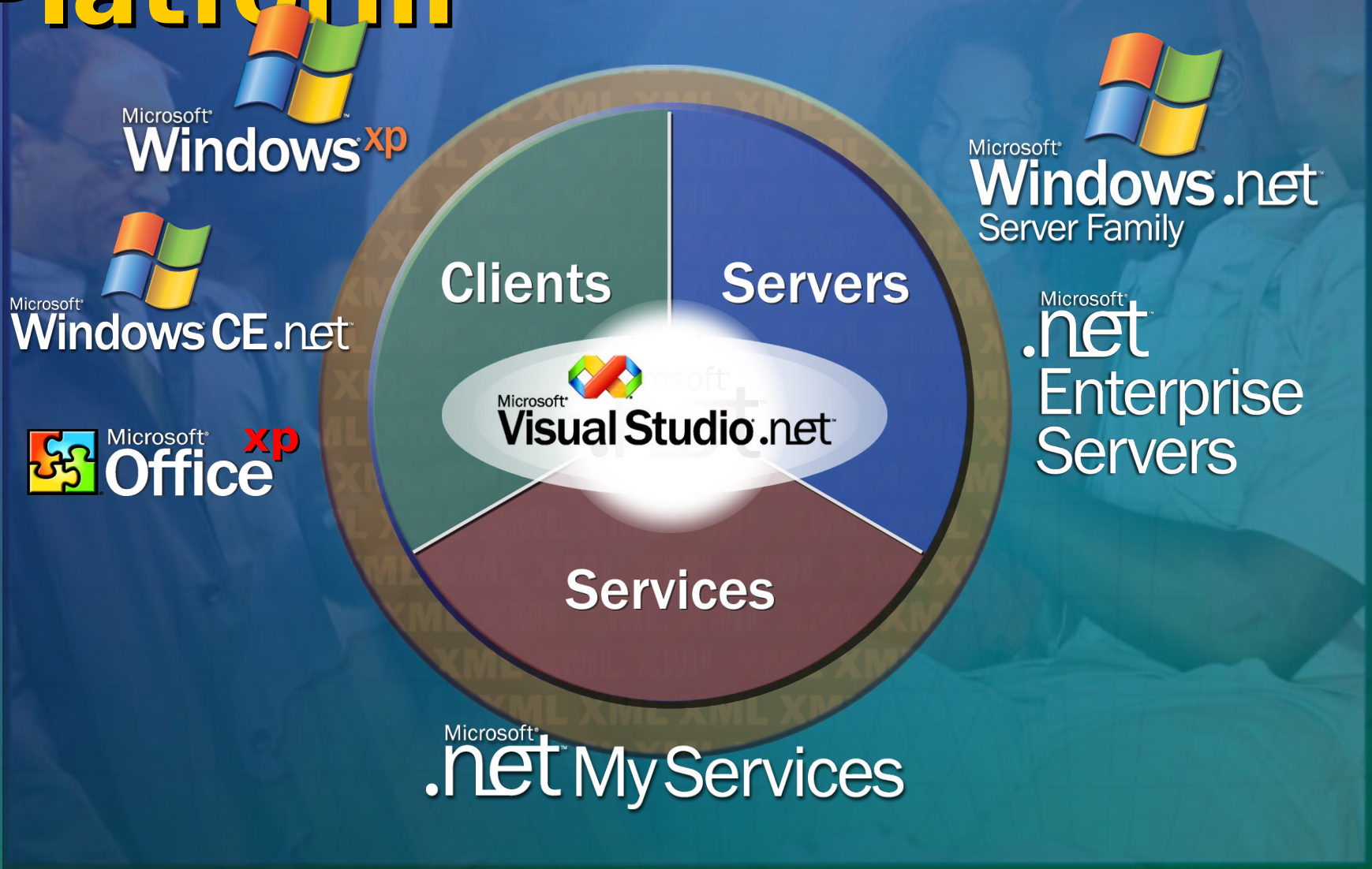
Windows.net™

Server Family

AWS304: .NET Framework Overview

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Technical Evangelist
Developer Division
Microsoft Corporation**

The Microsoft® .NET Platform



The .NET Advantage

Microsoft's XML Web Services Platform

- **Native XML Web services architecture**
 - Complete .NET infrastructure is XML to the core
 - One programming model: clients, servers, services
 - Comprehensive, integrated .NET product suite
- **Maximum development productivity**
 - Fastest time to market
 - Most productive toolset with support for 24 languages
 - Largest developer base: 65% market share
 - Extends existing skills, code, applications
- **Operational excellence**
 - Designed for scale up and scale out architectures

Core .NET Developer Platform

Windows®

- Core services for scalable, reliable, manageable applications
- .NET Framework makes XML Web services integration capabilities native to the platform

Key Features

- .NET Framework
- IIS and COM+
- Clustering and failover
- Active Directory



Visual

Studio® .NET

- Harnesses power of Windows platform for all developers
- Unifies application & service development in one productive development environment

Key Features

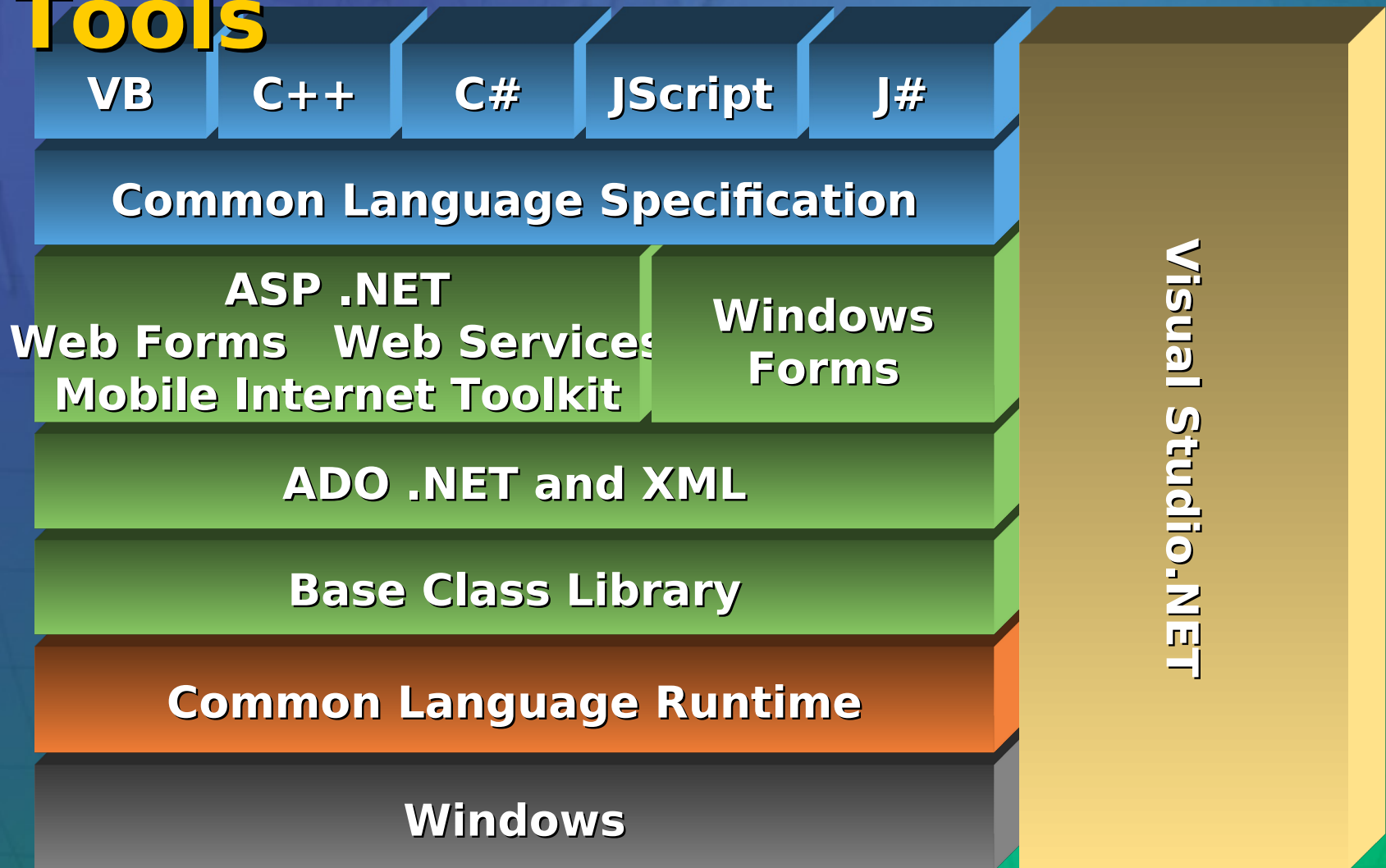
- Graphical designers
- Templates and frameworks
- RAD for client *and* server
- XML Web services



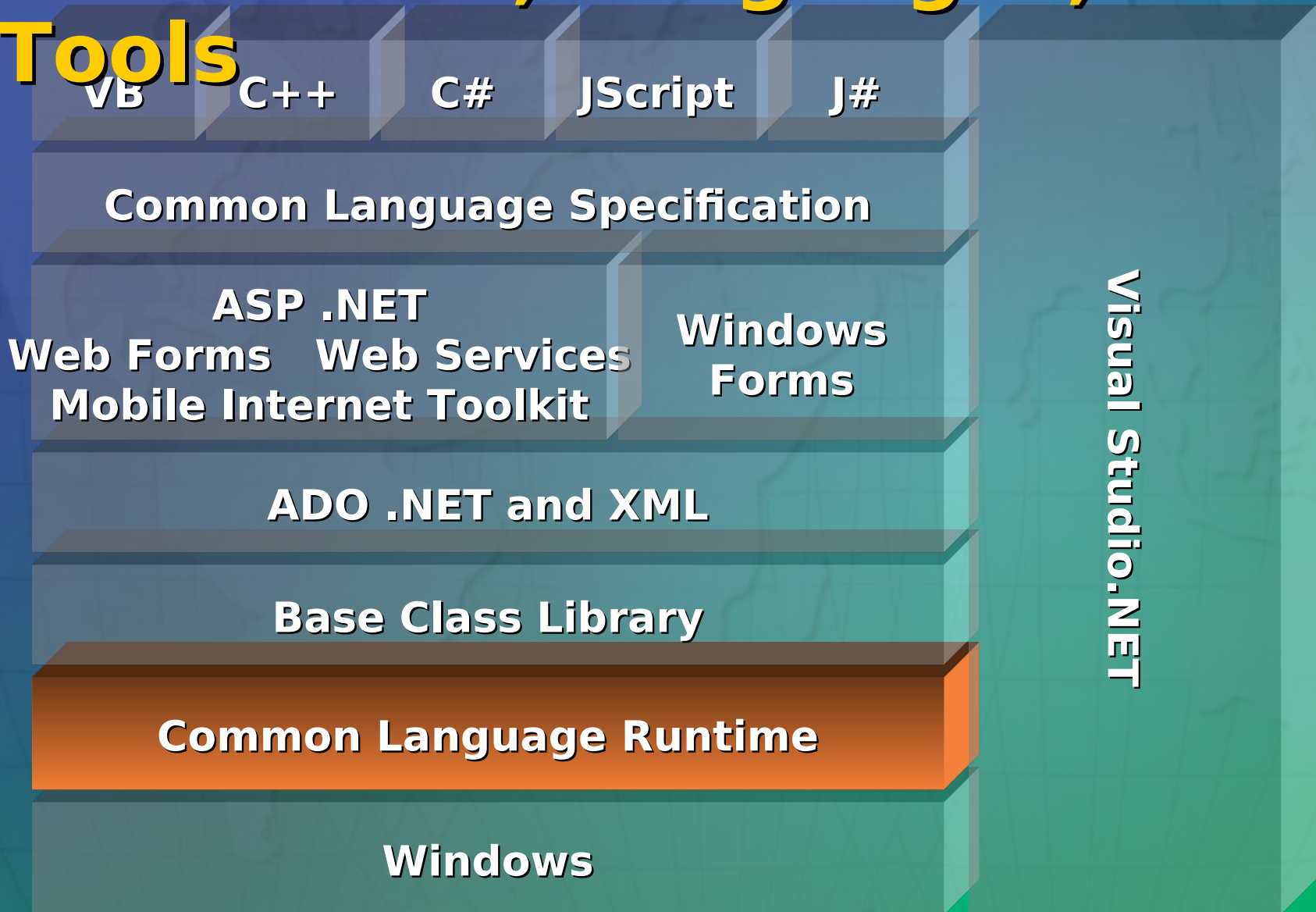
.NET Framework Design Goals

- **Unifies programming models**
- **Dramatically simplifies development**
- **Provides robust execution environment**
- **Supports multiple programming languages**
- **Natively supports XML Web Services**

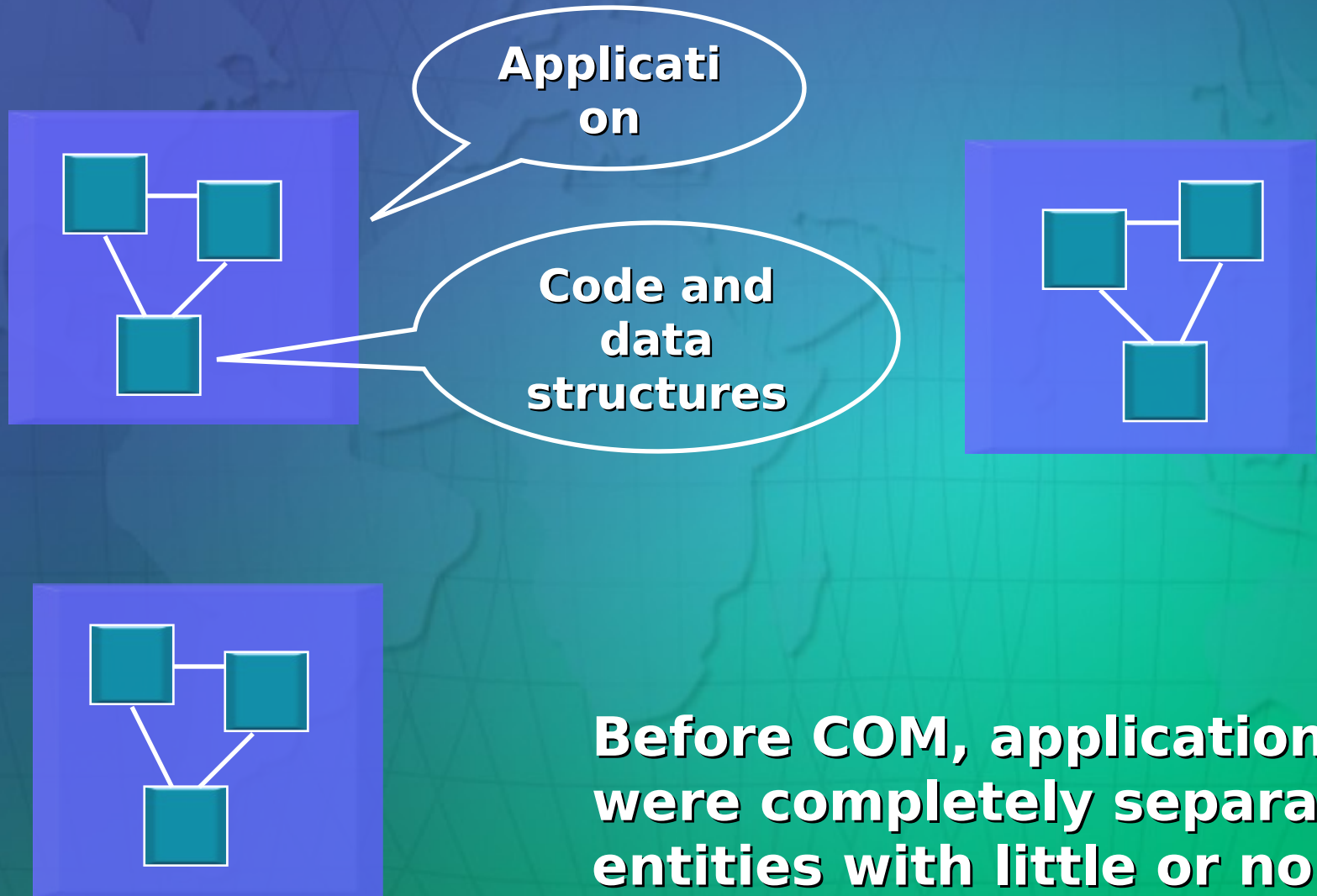
Framework, Languages, And Tools



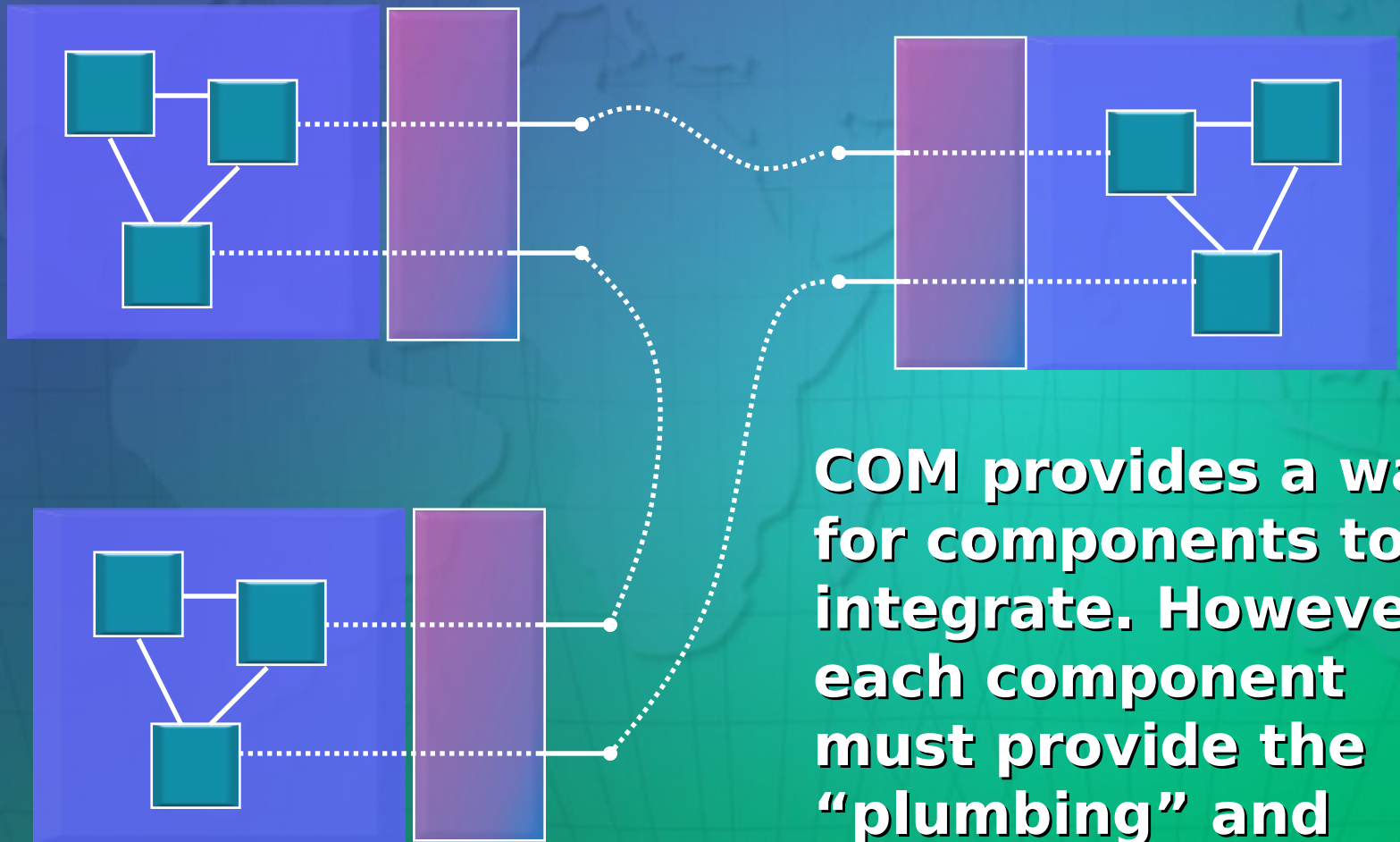
Framework, Languages, And Tools



The .NET Evolution

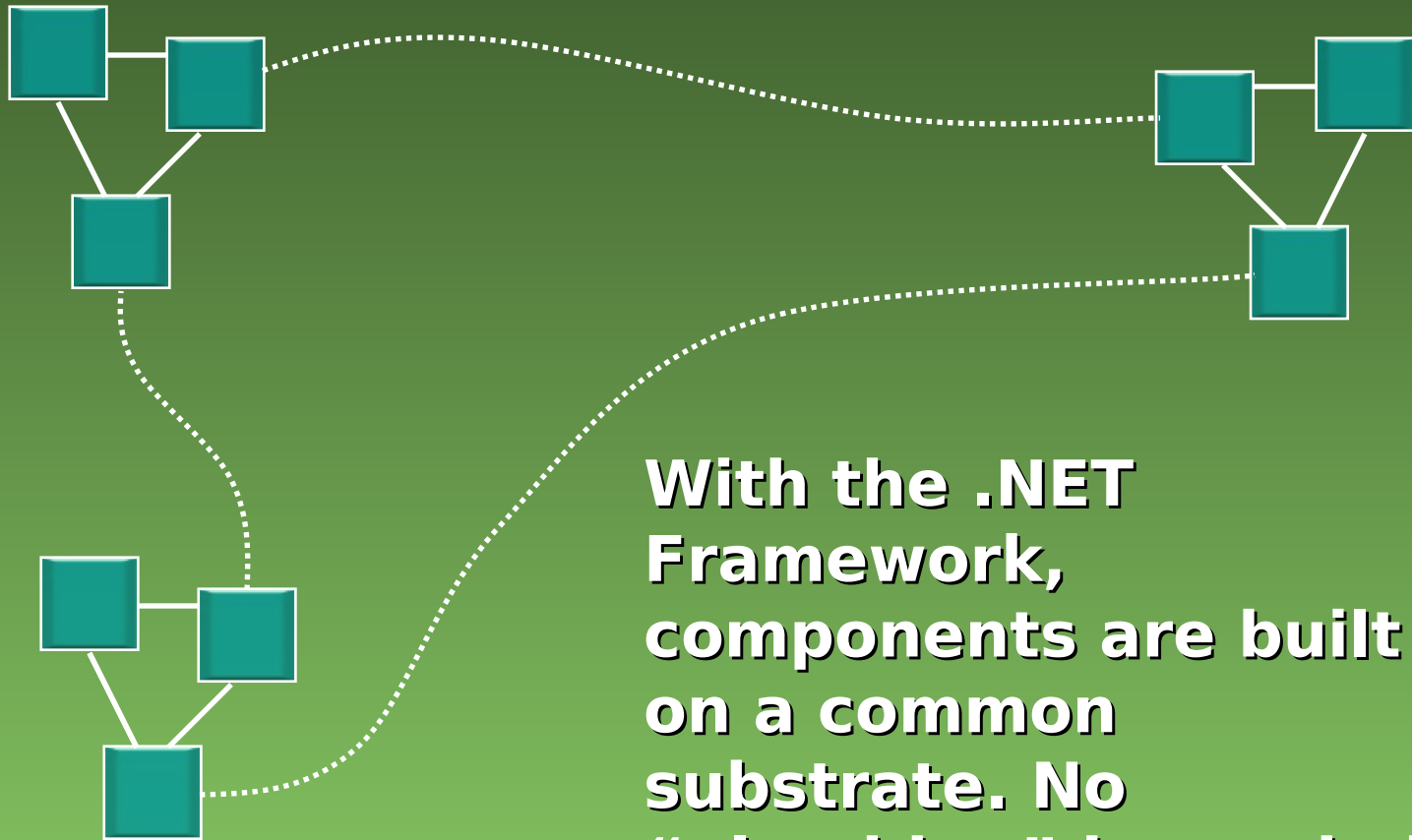


The .NET Evolution



COM provides a way for components to integrate. However, each component must provide the “plumbing” and objects cannot directly interact.

The .NET Evolution



With the .NET Framework, components are built on a common substrate. No “plumbing” is needed and objects can directly interact

Simplify Development

- **Completely eliminates COM plumbing**
- **No more...**
 - **Registration** => self described apps
 - **GUIDs** => hierarchical namespaces
 - **.IDL files** => unified object model
 - **HRESULTS** => structured exceptions
 - **IUnknown** => common root object
 - **AddRef/release** => garbage collector
 - **CoCreateInstance** => "new" operator

Simplify Development

- **Common Type System**
 - **Common instance and type definition**
- **Enables clean OO programming**
 - **Classes and Interfaces**
 - **Constructors, Properties, Methods**
 - **Cross language inheritance**

Everything Is An Object

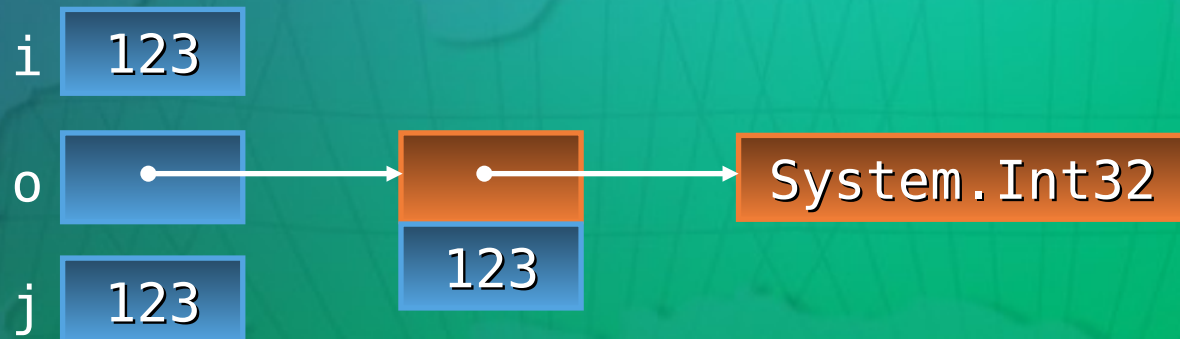
- **Traditional views of primitive types**
 - C++, Java: They're "magic"
 - Smalltalk, Lisp: They're full-blown objects
- **The .NET Framework unifies with no performance cost**
 - Deep simplicity throughout system
- **Improved extensibility and reusability**
 - New primitive types: Decimal,

Everything Is An Object

- **Boxing**
 - **Allocates box, copies value into it**
- **Unboxing**
 - **Checks type of box, copies value out**

```
Dim i As Integer = 123  
Dim o As Object = i  
Dim j As Integer = CInt(o)
```

```
int i = 123;  
object o = i;  
int j = (int)o;
```



Robust Environment

- **Automatic lifetime management**
 - All objects are garbage collected
- **Exception handling**
 - Error handling 1st class and mandatory
- **Type-safety**
 - No buffer overruns, No unsafe casts, uninitialized variables
- **Deployment and management**
 - Assemblies, side-by-side execution
 - No more DLL hell!

.NET Framework Security

- Security designed-in throughout the framework
- Code access security enforcement
 - Security based on the identity of code
 - Administratively configurable via policy
- ASP .NET integrated authentication of user
 - Windows identity, Passport, forms-based, ...
- Cryptography library with XML DSIG support
 - Digital signature for XML (www.w3.org/signature)

Multi-Language Platform

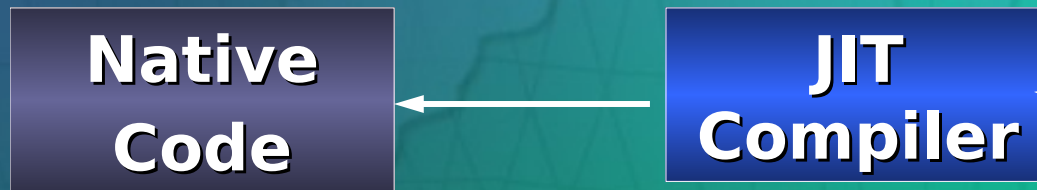
- **The .NET Platform is language neutral**
 - **All .NET languages are first class players**
 - **Complete cross-language integration**
 - **Highly leveraged tools**
- **Microsoft is providing**
 - **Visual Basic, C++, C#, J#, JScript®**
- **Industry and academia**
 - **APL, COBOL, Eiffel, Fortran, Haskell,**

Compilation And Execution

Compilation



Execution



*Before
installation or the
first time each
method is called*

Assemblies

- **Unit of deployment**
 - **One or more files, independent of packaging**
 - **Self-describing via manifest**
- **Versioning**
 - **Provided by compiler use of attributes**
 - **Policy per-application as well as per-machine**
- **Security boundary**
 - **Assemblies are granted permissions**
 - **Methods can demand proof that a permission has been granted to entire call chain**

Simplify Deployment And Management

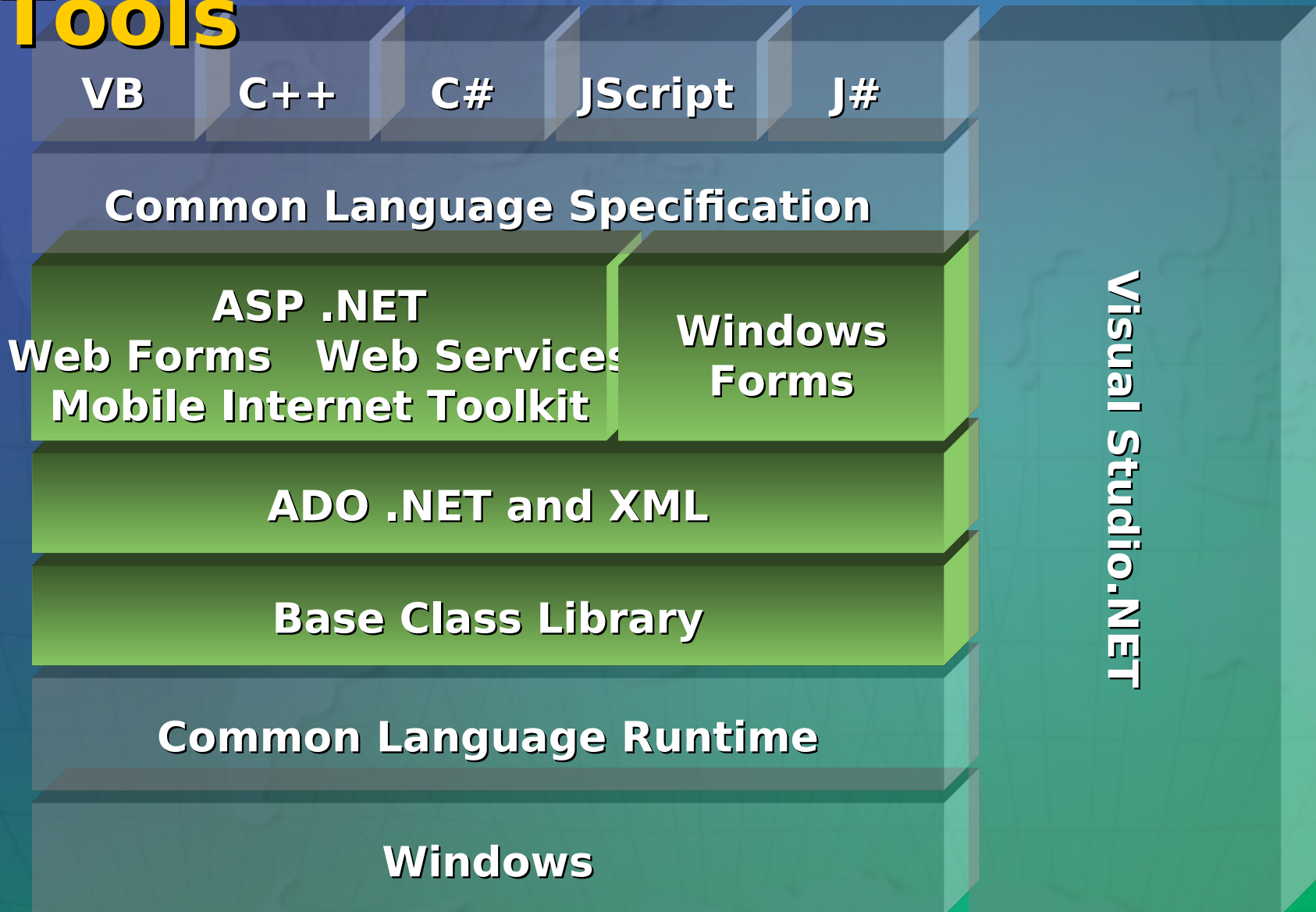
- **Zero-impact install**
 - **Applications and components can be shared or private**
- **Side-by-side execution**
 - **Multiple versions of the same component can co-exist, even in the same process**

The background of the slide is a map of Europe, rendered in a light blue color. The map is overlaid with a grid of latitude and longitude lines. The entire background has a color gradient that transitions from a deep blue on the left to a vibrant green on the right.

Terrarium

demo

Framework, Languages, And Tools



Make It Simple To Use

- **Organization**
 - **Code organized in hierarchical namespaces and classes**
- **Unified type system**
 - **Everything is an object, no variants, one string type, all character data is Unicode**
- **Component Oriented**
 - **Properties, methods, events, and attributes are first class constructs**
 - **Design-time functionality**

How Much Simpler?

Windows API

```
HWND hwndMain = CreateWindowEx(  
    0, "MainWClass", "Main Window",  
    WS_OVERLAPPEDWINDOW | WS_HSCROLL | WS_VSCROLL,  
    CW_USEDEFAULT, CW_USEDEFAULT,  
    CW_USEDEFAULT, CW_USEDEFAULT,  
    (HWND)NULL, (HMENU)NULL, hInstance, NULL);  
ShowWindow(hwndMain, SW_SHOWDEFAULT);  
UpdateWindow(hwndMain);
```

.NET Framework

```
Form form = new Form();  
form.Text = "Main Window";  
form.Show();
```

Factored And Extensible

- **The Framework is not a “black box”**
- **You can extend most .NET classes through inheritance**
 - **Unlike COM, you’re using and extending the class itself, not a “wrapper”**
- **Plug-and-play components and subsystems**
- **Cross-language inheritance!**

Web Standards/Practices

- **The .NET Framework supports**
 - **HTML, XML, SOAP, XSLT, XPath**
- **Web services enables internet scale distributed apps**
 - **State-full connected model does not work**
 - **Loosely connected web services enables scalable apps**
- **XML support is built in deeply**
 - **Data, remoting, serialization, documentation, config**
- **This affects everything**
 - **Base services, data access, UI, invocation/activation, programming model, tools**

Unify Programming Models

Consistent API availability regardless of language and programming model

.NET Framework

RAD,
Composition,
Delegation

Subclassing,
Power,
Expressiveness

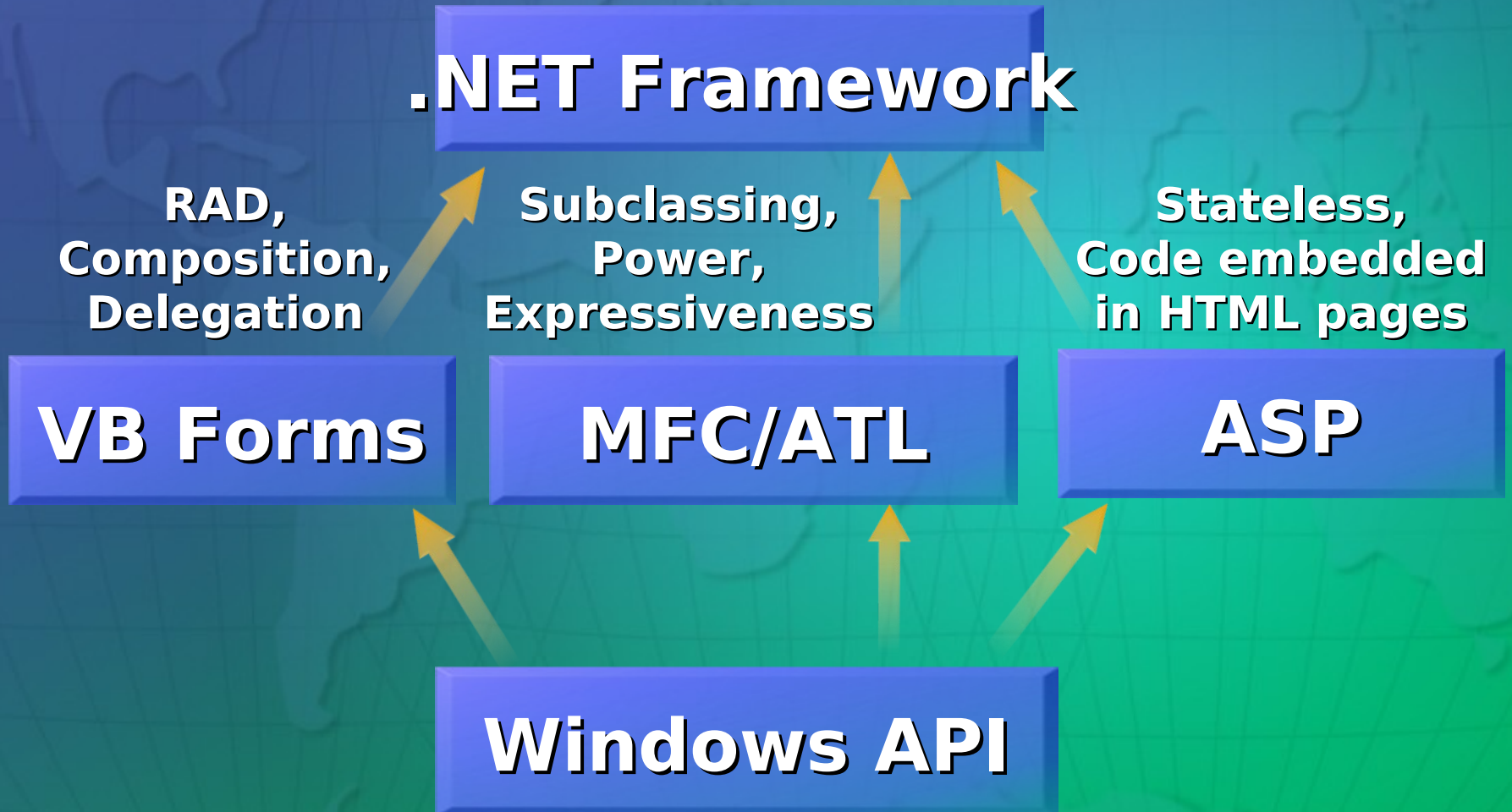
Stateless,
Code embedded
in HTML pages

VB Forms

MFC/ATL

ASP

Windows API



The .NET Framework

ASP .NET

**Web Forms Web Services
Mobile Internet Toolkit**

Windows Forms

ADO .NET and XML

Base Class Library

The .NET Framework

System.Web

Services

Description

Discovery

Protocols

Caching

Configuration

UI

HtmlControls

WebControls

Security

SessionState

System.Windows.Forms

Design

ComponentModel

System.Drawing

Drawing2D

Imaging

Printing

Text

System.Data

ADO

Design

SQL

SQLTypes

System.Xml

XSLT

XPath

Serialization

System

Collections

Configuration

Diagnostics

Globalization

IO

Net

Reflection

Resources

Security

ServiceProcess

Text

Threading

Runtime

InteropServices

Remoting

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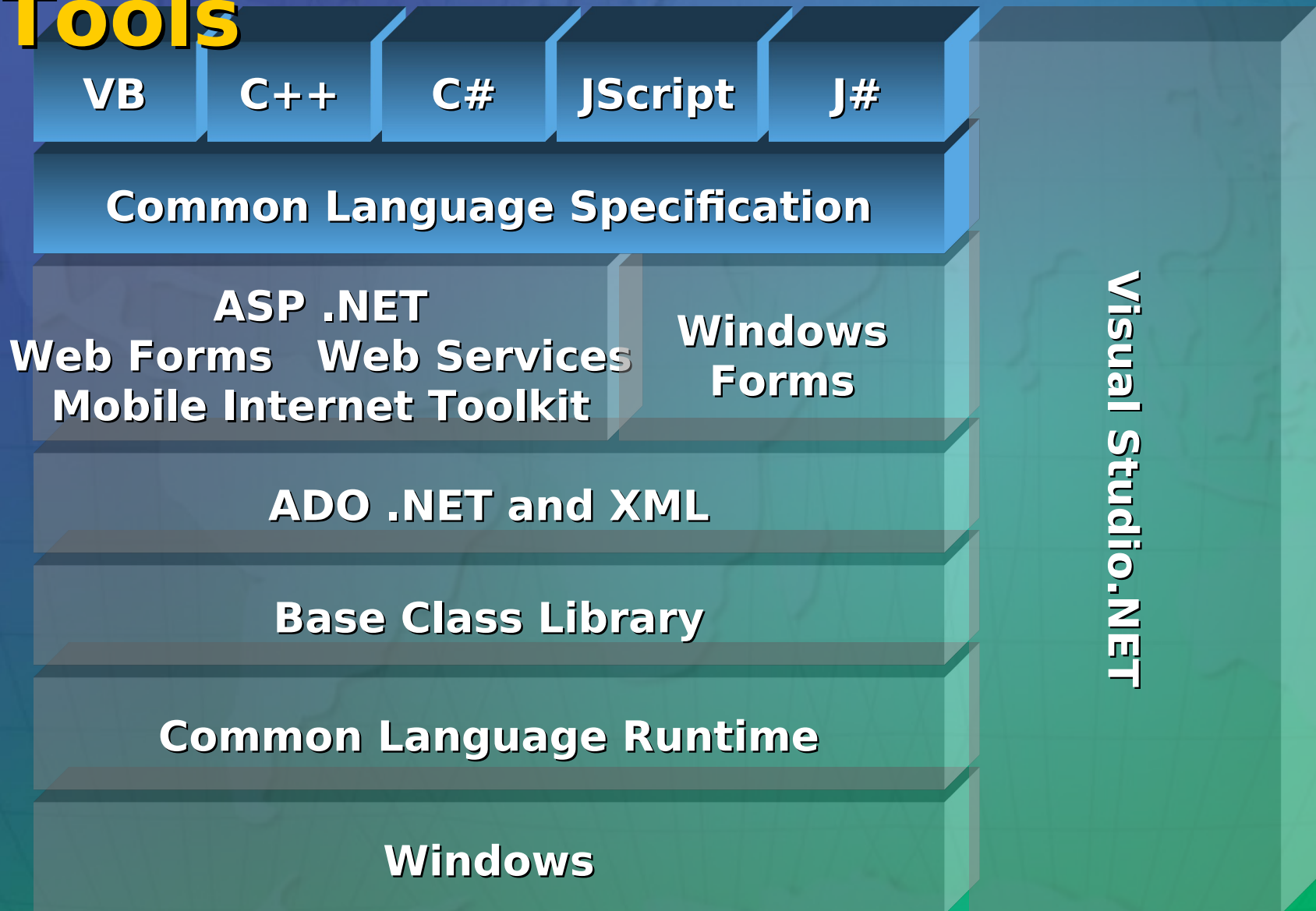
Drawing2D

Printing

Imaging

Text

Framework, Languages, And Tools



Languages

- **The .NET Platform is Language Neutral**
 - All .NET languages are first class players
 - You can leverage your existing skills
- **Common Language Specification**
 - Consumer: Can use the .NET Framework
 - Extender: Can extend the .NET Framework
- **We are providing**
 - Visual Basic, C++, C#, J#, JScript
- **Third-parties are building**
 - APL, COBOL, Pascal, Eiffel, Haskell, ML, Oberon, Perl, Python, Scheme, Smalltalk...

Standardization

- **CLI and C# are international standards**
 - Ratified by ECMA on Dec. 13, 2001
 - ECMA-334 (C#) & ECMA-335 (CLI)
 - Co-sponsored by Intel & Hewlett-Packard
 - Fast-tracked to ISO
- **Common Language Infrastructure**
 - Based on .NET Common Language Runtime and Class Libraries

Summary

- **Unifies programming models**
- **Dramatically simplifies development**
- **Provides robust execution environment**
- **Supports multiple programming languages**
- **Natively supports XML Web Services**

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